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ABSTRACT

This study concerns itself with the guest for reliable methods of helping a greater percentage of inner city junior high school students in New York pass the ninth-year Regents examination. It investigates the hypothesis that assigning inner city students to algebra by mathematics levels rather than reading levels will result in a higher passing percentage on the examination. This investigation also looks at: (1) Is student failure on the Regents test a result of pupils being unaware of its nature and purpose; (2) Is there a combination of reading and mathematics scores that will insure examination success; and (3) Are other factors more significant than reading and mathematics scores in determining success or failure on the Regents test. The study focuses on 36 students placed in the September 1980 Regents Algebra class based on testing of 435 eighth-grade students at Sands Junior High School in New York City. The class consisted of 22 students chosen on the basis of mathematics scores, 14 selected on reading scores. Among the results, it was found students assigned to algebra based on mathematics test scores did not do significantly better than students assigned based on reading scores. It is felt that this finding has definite instructional implications. (MP)

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COLUMBIA PACIFIC UNIVERSITY

INDEPENDENT STUDY PROJECT - COVER SHEET

PREDICTING INNER CITY JUNIOR HIGH SCHOOL STUDENTS' SUCCESS ON THE ALGEBRA REGENTS

by

ELWOOD GENE EDWARDS

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Submitted to the Faculty of Columbia Pacific University in partial fulfillment of the requirements for the Degree of Doctor of Philosophy with Major in Education.

Faculty Mentor/Reader: Dr. Dennis Adams/ Dr. Paul Stuetzer

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CHAPTER I

INTRODUCTION

Academic failure in algebra is one of the major problems confronting administrators, teachers, and counselors in schools and colleges. Algebra is difficult for many students, and the question of which students should be advised to enroll in first year algebra in order to minimize failure in the discipline continues to plague academia. Not all failures are a result of a lack of academic ability or aptitude. Mental or intellectual ability are not the exclusive determinants of academic achievement or success. Often there are factors that are overlooked or underestimated by educators. The discrepancy between potential and achievement is readily apparent among students in the junior high schools of large inner cities. These students are generally the ones who experience the greatest degree of academic failure in our educational institutions. Failure, however, in any form is both a problem to the individual, who may suffer from a sense of failure and frustration, and to society, which loses the total potential contribution of a large number of its members.

For several years now, administrators, legislators, and educators have been concerned with the high percentage of failure among inner city students taking Regents examinations in

New York State. Although new methods and objectives have sought to reduce this situation (Myers, 1979; Swafford, 1978) the problem persists. In New York State much controversy has centered around probable causes for students' failure and poor performance on achievement and aptitude tests such as the Regents, Scholastic Aptitude Test-SAT, and the American College Test-ACT (Angoff, 1975; Babcock, 1975; Ebel and Rogers, 1976; Ferguson and Maxey, 1976; Harnischfeger and Wiley, 1975; Hawthorne, 1972; Hechinger, 1974; Littlefield, 1966; McCandless, 1975; Munday, 1976; Scully, 1975; Winkler, 1975).

There have been many studies on the causes of poor student performances and failure on these tests, yet very little has been contributed toward devising ways to minimize certain students' academic failure on Regents examinations. The reason for this paucity of knowledge is that most investigators of the Regents have been concerned with such general questions as the nature of Regents testing and the need to evaluate Regents examinations. To date, relatively little attention has been devoted to the relationship between certain variables and inner city junior high school students' success on Regents examinations.

The major concern of this investigation is to devise ways that will enable a higher percentage of inner city junior high school minority students to pass the algebra Regents examination. A systematic examination of students' math level and reading level is proposed in order to determine which of these variables will best predict students success on the algebra Regents. Also, the extent of students' awareness of the nature and purpose of the Regents is explored to determine if this factor is a potential way of forecasting students' success on the algebra Regents examination.

PROBLEM

This study is concerned with the quest for a reliable method or methods of helping a greater percentage of inner city junior high school students in New York pass the ninth year Regents examination. It investigates the hypothesis that assigning inner city junior high school students to algebra by math levels instead of reading levels will result in a higher percentage of students passing the Regents examination. The importance of this study lies in its close association with other related problems such as low motivation, anxiety, and frustration. Frustration comes as a result of failure (Chansky, 1966; Sobel, 1975). Frustration often leads to students' negative attitudes toward school thus leading to school dropout, crime or some other deviant social behavior. Failure is never confined to the individual but is a problem of society as well. Thus a good method that can forecast students' chances for passing the algebra Regents examination is needed. Conceivably such a method should do much to eliminate possible traumatic experiences for the students, as well as help society with unnecessary burdens. A good predictive system would enable guidance counselors, administrators, and teachers to assign students to Regents Algebra only if these students have had adequate preparation necessary for success on the Regents examination.

The quest for successful prediction devices is a unique one. There is no mathematical formula with which success or failure can be predicted accurately, nor is there any method which will work successfully for all students. Students are different in many ways (socioeconomically, racially, ethnically, etc.), and over a period of time diverse populations perform uniquely on similar tests. According to a recent report (Chambers, 1977), the Chancellor of the New York City schools reported that projections indicate that the population of New York inner city schools over the past 10 years (1967-1977) has gone from 68% White, 32% minority to over 80% minority (Black and Hispanic) to less than 20% White. The Chancellor further intimated that this trend would continue to widen in the next 10 years. With the change in inner city school population, different ways of assuring students' success are needed. Therefore, of educational importance, devising a reliable predictive method of success for minorities should help improve student-teacher relationships. The teacher is without question a key to successful classroom learning experience. There is much research that supports the fact that teachers' interaction with students vary with their expectations.

Cornbleth, Davis and Button (1974), Gaite (1974), Kester and Letchworth (1972), and Rothbart, Dalfren and Barrett (1971) point out that teachers appear to spend more time and interact more positively with high achievers and successful students than with low achievers. Thus when teachers have greater expectations of their students, the general academic performance of students on achievement tests are evidenced (Gaite, 1972). Another reason for the importance of this study is that an attempt is made to find ways to improve students' understanding of the nature and purpose of the Regents tests. In addition, since the New York State Education Department does not make available for public use Regents test score results for comparison between schools or individuals, this study will contribute to the argument against such practice. Implied in this practice is that minority students' poor performance on the Regents examinations is kept secret by the Education Department. This study will also contribute to the philosophy of education which maintains that students perform best when they are placed in the least restricted environment.

According to the Lora Decree (Public Law 94-142) (1975), a recent court decision was made to assure that all handicapped children have appropriate public education. One of the implications of this law is that children from culturally deprived areas may themselves be "handicapped," and therefore, the findings of the Lora Case pertain to them. So another importance of this study is that it relates indirectly to the procedures which pertain to placement, classification, and evaluation of disadvantaged children. The Lora Case, although began as a single case, ultimately became a class action on behalf of all Black and Hispanic students enrolled in the

New York City public school system.

Still another significance of this study is that an effective method of helping student succeed in algebra (math) will help motivate them to learn other subjects, as well as higher mathematics. Finally, this study has practical educational importance because if an effective method is devised to ensure student success, students will gain a better self-image and perhaps develop into more productive citizens.

PURPOSE

The study was developed as an outgrowth of the questions posed when the topic of selecting students for Regents Algebra was brought up by the teacher, the guidance counselor, and the assistant principal at the school under investigation. The study was undertaken as an attempt to provide answers for the following questions:

1. Do students who have high math scores perform better on the algebra Regents than students with high reading scores?

2. Are students' failure on the Regents test a result of their being unaware of the nature and purpose of the test?

3. Is there a combination of these factors (reading and math scores) which will ensure success on the Regents examination?

4. Are there other factors more significant than reading and math scores in determining success or failure on the algebra Regents examination?

METHOD

In April 1980, 435 eighth grade students at the Sands Junior High School in New York City were administered the California Achievement Test-CAT, which measures students' achievement in mathematics and reading skills. One of the purposes of administering the test was to select students who would take Regents Algebra in the ninth grade in the fall. Students not enrolled in Regents Algebra take Pre-Algebra or General Mathematics. The present practice is to test students in the eighth grade and to place students who achieve the highest reading (grade equivalent average--G.E.) scores into the Special Progress (SP) class during the ninth year. These students are also scheduled to take Regents Algebra. Over the past six years, at this school the percentage of students failing the algebra Regents has been alarming. From 1975 to 1980, the breakdown of the numbers of students who passed the algebra Regents was as follows: in 1975, 14 of 56 (25%); in 1976, 10 of 92 (11%); in 1977, 7 of 32 (22%); in 1978, 2 of 63 (3%); in 1979, 5 of 29 (17%); in 1980, 7 of 22 (31%). These results when compared to those of 1972 and 1973 are even more appalling. In 1972 of thirty-three students taking the algebra Regents eighteen received passing scores of 65% or better. In other words, about 55% of the students passed the test. In 1973 of sixty-eight students taking the exam, twenty-nine passed, about 40% of the students taking the exam. No further data on Regents examination scores were available for other years because the results of individual students' performance on the Regents examinations are not officially maintained at the school by the administration. The data on Regents results were obtained from the teachers who had taught Regents Algebra during the years cited.

For the purpose of this investigation, instead of selecting all Regents Algebra students based on reading scores, the investigator persuaded the guidance department and the assistant principal to select some of the students based on their overall average (G.E.) math scores. In June of the same year (1980), all 435 of the eighth grade students were also administered the Science Research Associates-SRA math test which measures students' achievement in mathematics computation, concepts, and problem-solving skills. This test was given because of its correlation with the learning objectives of the curriculum mandated by this school's district. This test was also administrated because of the controversy that developed around the results of the CAT scores in the New York City school system. Of the original population, 36 students were selected for ninth year Regents Algebra. Since 77 of the original 435 students were going to high school in September, the 36 students selected for Regents Algebra came from the remaining population of 358 students. The 36 students consisted of two groups. The first group (Group I) was 24 students who received the highest math (G.E.) scores on the California Achievement Test. The 12 remaining students (Group II) who received the highest reading (G.E.) scores among the 334 students were also chosen for Regents Algebra. Afterwards, the eighth grade math teachers of the 36 students were asked to recommend or not recommend the students for algebra. The teachers' recommendations were based upon teachers' perception of the students' performance in class, students' expected final grade, and the teachers' judgment whether or not he or she "felt" the student would succeed in algebra. Since all of the eighth grade teachers had previously taught Regents Algebra, the researcher felt that fair judgments were made by the teachers. Each student was then ranked and received a code (ID) which consisted of the first five digits of the students' school ID number.

In September 1980, all thirty-six of the students were placed in the same Regents Algebra class. For the purpose of the study, they were assigned to two groups: Group I based on math scores and Group II based on reading scores. During the first month of algebra instruction, the students were administered a survey questionnaire to assess some of their characteristics and their awareness of what is the nature and purpose of taking the Regents examination. It must be pointed out, however, that at the end of the first month of instruction, because of attrition, the first group had only 22 students because two students had been transferred to different junior high schools in the same district.

However, two new students who had recently transferred to the school were placed in the Regents Algebra class. These students were assigned to the class based on their reading scores because no math scores were available for them at the time. Thus, for the purpose of the study, they were placed in Group II. All of the students' test scores were obtained from the actual computer print-out sheet made available by the administration of the school.

The experimental phase of this investigation was from September 1980 to June 1981 representing a regular school year. The students attended their algebra class as a regular subject. They were not in any special location in the school building. However, one factor worth noting is that after consulting with the guidance counselor and the assistant principal, the investigator obtained permission for the students to take algebra during the first period of each day. The students were instructed in a conventional manner and classroom lessons periods were for forty-five minutes, five days a week. According to New York State requirements, students enrolled in Regents Algebra are to receive a total of two hundred hours of instruction. Meeting five times a week for forty weeks fulfilled this mandated state requirement. Students received bi-monthly teacher-made examinations based on classwork and homework assignments. Students received homework daily. In addition, in January, students received a midterm examination based on the curriculum, and prepared by the school's math department. Students received two weeks of special drill (review) for the Regents examination during the month of June.

SUBJECTS

Thirty-six ninth grade students at the Sands Junior High School in New York City were selected for the study. A comparison of the sample with all ninth grade inner city junior high students in the school system reveals very little difference in math ability as measured by the April, 1980 California Achievement Test. Sample mean, group means, standard deviations, and ranges for the Science Research Associates test scores were considered normal for this typical inner city school. On the California Achievement Test, however, this same test measurements criteria of the scores were considered "questionable above normal" for this particular school. The reasons for this imbalance, however, is beyond the scope of this study.

SOURCES OF PUPIL DATA

The California Achievement Test which is a well known national achievement test was the source of one set of math and reading scores. The test scores were obtained from the computer print-out sheet of the April 1980 test results made available by the school administration. The Science Research Associates-SRA test was the source of the other set of math scores. The test score results were obtained from the students' answer sheets from the Science Research Test. In addition, each student was assigned a score of 1 or 0 based on the responses given on the teachers' recommendation forms and the researcher's prepared questionnaire. The questionnaire also supplied information on the students' ethnic background, study habits, and attitudes towards algebra. The results of the students' June 1981 Regents scores were obtained from the acutal corrected test papers.

REASONS FOR FAILURE

Many theories and endless speculation have been advanced by laymen and educators to account for students' failure and low scores on tests such as the Regents examinations. Angoff (1975), Babcock (1974), Breland (1976), Copperman (1979), Flaugher (1969), Hechinger (1974), Herrington (1980), Labov (1972), Walberg and Marjoribanks (1979) offered intellectual inability as one possible cause. Cole (1972), Darlington (1971), Linn and Werts (1971) and D. White (1976) argued that poor test selection and practices are causes for students' poor performance and test scores decline. Quality of instruction (Bloom, Hasting and Madaus, 1971) has been cited also. According to Dreeben (1968), Walker and Schaffarzick (1977), and M. A. White (1968), curricula changes in response to social needs are partially responsible for poor performance on achievement tests.

Compositional and organization changes in secondary schools (Harneschfeger and Wiley, 1976; Munday, 1976) are offered as causes for student failure. According to Maffei (1977) and Sapone and Guiliano (1976), a drop in enrollment of students in mathematics courses parallel closely student failure and test scores decline. Teacher mobility which might be an indicator of student outcomes is also advanced by Rafferty (1976) as a major factor for student failure. According to Bower (1973), the National Educational Association-NEA (1976) and I/D/E/A (1975), TV ownership and the amount of time that families spend viewing television have contributed to student failure on tests such as the Regents examinations. The National Institute on Drug Abuse reports that eight to fourteen year olds constitute the fastest growing group of drug users (Holden, 1975; I/D/E/A, 1975). This fact has a serious impact on students' performance on achievement test such as Regents examinations and other standardized achievement tests.

Discrimination against minority groups (Breland, 1976; Davis and Temp, 1971; Jensen, 1971; Williams, 1972; Winkler, 1975) has also been alleged as a cause for poor test scores and students' failure. Perhaps one of the most astounding reasons advanced as a cause for students' failure and test scores decline is that advanced by Zajonc (1976). His thesis is that birth order and family size is directly related to students' poor performance and test score decline (Breland, 1974; Farley, 1977; Melican and Fedlt, 1980; Zajonc, 1976). Poor student motivation (I/D/E/A, 1975; Maehr, 1976; Muller 1975; Rafferty, 1976) and poor ability grouping (Aikens, 1970; 1974; Borg, 1966; Findley and Bryan, 1971; Hegstrom and Riffle, 1973; McPartland, 1969; NEA, 1968; Williams, 1972) have also been cited as causes for students' failure on examinations.

In addition to these causes, lack of homework (Garner, 1979; Maffei, 1977), poor attendance (Scott, 1978), lack of accountability (Baron, 1972; Porter, 1972), inadequate preparation and poor study habits (McGarvey, 1962; Messler, 1962; Thomas, 1972) are other probable causes for failure. Attitudes towards examinations (Aikens, 1970; 1974; Barrick, 1980; Chansky, 1966) are still other often cited causes of students' failure of examinations. Another reason presented as a cause of students' failure on these examinations is anachronistic features of the tests such as the Regents (Brickell, 1961; Crewson, 1966; Friedman, 1964; Littlefield, 1966; Madeo, 1968; Minotti, 1952; Stafford, 1968).

Quinones (1979) points out that little comfort can be taken in the poor results of math achievement by students in New York State and throughout our country as well. Math has been subjected to a state of benign neglect by virtue of attention placed on reading. ED, USA (1976) and Faux (1980) like Quinones point out that with the great emphasis placed on reading, the question is raised whether or not students' failure on Regents examinations is due to their poor reading scores. In addition to the above causes there are a host of other socioeconomic factors related to students' failure on examinations such as the Regents.

DEFINITIONS

Failure and Success

Failure and success have many meanings to many different people. For the purpose of this study failure means students' inability to measure up to what they are capable of doing or expected to do based on the criteria of the algebra Regents examination. In other words, failure means not obtaining at least 65% in the algebra Regents examination. Success, therefore means achieving 65% or more as a passing grade on the algebra Regents examination.

Inner City

For the purpose of this study inner city is defined as an area characterized by concentration of low income families. These families are found in the center of large urban areas which are also designated as "urban ghettos," "ghettos" or "impoverished areas." Terms such as disadvantaged, culturally deprived, educationally disadvantaged, or minority group members, although not intended to suggest implications of labeling certain groups will all be used synonymously with inner city students. The inner city schools are the institutions of learning where a majority of the children of these families attend.

Junior High Schools

Junior high schools for the purposes of this study are schools located in the inner city areas with grades 7, 8 and/or 9. The age group of the students in these schools are in generally the 12-15 years category. The schools are also usually designated as Title I schools under a local district or community governing body known as the Local School Board. These schools are sometimes referred to as urban secondary schools. These junior high schools are characterized by students who are called disadvantaged, urban, or culturally deprived, and the racial-ethnic composition of the students of such schools is predominately Black and Hispanic (Spanish-speaking).

Regents Examination

Regents examination is any examination prepared by and administered by the New York State Board of Regents, the educational policy makers of the New York State Department of Education. Thus, in places, the word Regents will be used to stand for any state wide examination. In other places, it is referred to as the "traditional" Regents. It is the final examination taken by students enrolled in Regents Algebra. The exact title of the test is the New York State Regents High School Examination (Ninth Year-Mathematics).

LIMITATIONS

The major limitations of this study is that of size. This study is limited to only 36 students in one inner city junior high school class in New York City. There are only two groups of students, one originally consisting of 24 subjects classified by math scores, and the other consisting of 12 subjects classified by reading scores. Another limitation is that the investigator, a teacher of mathematics for 13 years, is also the teacher of the algebra class under investigation in the study. The study is further limited to the findings based upon this particular school's ninth grade algebra students.

Students are classified based on scores received on a standardized achievement test. No consideration is made in grouping the students by sex, age, race or ethnic background. Another limitation is that the experimental phase of the study is a regular school year; therefore, the only treatment received by the subjects is instruction they receive during the course of a school year. Success or failure is measured by the results students receive on the basis of their performance on the algebra Regents examination in June 1981. No consideration is given to style of teaching or method of teaching in determining the students' performance.

A final limitation of this study is that the subjects belong to minority groups and are Black and Hispanic who live in the inner city ghetto. The findings of this study are not intended to apply outside of New York City ghetto areas in suburban or middle class White areas.

SUMMARY

In summary, the problem of this investigation is to investigate the feasibility of devising a reliable method or methods of helping a greater percentage of inner city junior high schools to pass the algebra Regents. Much of students' failure on Regents examinations is related to the selection process of placing students in Regents Algebra classes. The reasons for failure range from socioeconomic and academic to the question of learning disabilities.

In this study, it is the belief of the investigator, that valuable information has been gathered which will help ensure success for many ghetto students.

CHAPTER II

REVIEW OF RELATED LITERATURE

A number of approaches have been attempted to predict or find predictors of students' success in algebra, but to date none have sought to predict or devise ways to help a higher percentage of inner city junior high school students pass the algebra Regents examination. Perhaps the main reason for such lack of consideration concerning predictability for inner city students' chances for success on the algebra Regents is because of controversies surrounding the nature and purpose of Regents examinations.

Background and Purpose of Regents Examinations

To appreciate the significance of any investigation concerning the Regents examination in algebra, it is necessary to have a thorough background on the nature and purpose of the Regents examinations in New York State. The Regents examination program was established in New York State in 1865 to assist in high school admission and to ensure a minimal level of academic preparation (University of State of New York, 1965). The examinations proved so valuable that since 1878, the examinations have been given annually. The Regents examinations are statewide exams that set minimum standards of achievement and are generally considered as instruments for maintaining academic standards in high schools throughout New York State. The examination program has been regarded as one of the nation's most prestigious state-wide testing systems. The exams have also served as measures of academic achievement for college admissions and jobs. Some high schools have required passing Regents examinations for graduation. The exams are given to students who pursue courses whose outcome can be measured by Regents examinations. However, students usually have little or no choice whether or not they take a Regents course. Those who take Regents courses are usually average or above average in academic performance. The State Education Department provides the syllabi for courses in which Regents exams are given; local teachers administer and mark the exams. About 62% of the students in public and non-public schools in the state take the exams annually. The exams measure achievement in 21 different high school subject areas. They are given in January, July and August.

In spite of the general modification in the Regents testing program, its original stated goals of ensuring a minimal level of academic preparation and providing uniform and reliable measures for students' enrollment in Regents courses of study have remained the same. New York State is the only state where these comprehensive examinations remain. Even though the Regents examination system has a long history, it has been immune to many of the elements that led to the demise of similar programs in other states (Ladd, 1972). However, much controversy has centered around abolishing Regents examinations.

Controversy Centered Around Regents Examinations

Antagonists both inside and outside the state, claim that taking Regents exams is just a ritual, and the exams should be abolished. They further claim that the exams' liabilities outweigh their usefulness. Proponents for the Regents, on the other hand, say that the exams set minimum standards of achievement in the state's high schools, guarantee that the curriculum is taught, help students learn to assign priorities, and impart a high degree of satisfaction to students who master the courses of study in which Regents are taken. One of the most common criticisms of such uniform testing as the Regents examinations is the claim that they tend to stifle individual initiative and prevent schools from making forward steps in curriculum development (Littlefield, 1972). Brickell (1961) describes how preparation for these tests tend to dampen enthusiasm for innovations. The tests impede curricular experiment and force teachers into curricula patterns. Stafford (1968) makes the point that the Regents exams cause many teachers apprehension when they must turn to the drudgery of drilling for the tests. Dr. Bailey (Fleishman Report, 1974) points out that Regents examinations have helped to improve unimaginative, standardized curricula upon massively bored teenagers. He further contends that the exams have helped to promote an insidious caste system within the schools. The exams have provided a "Linus Blanket" for poor teachers. That is, teachers only teach the exams. Too many teachers allow the Regents exams to become an educational strait jacket. Insecure teachers, in particular, want to turn out students who score high on the exams. So instead of concerning themselves with a thorough, sound and interesting program, teachers teach the tests (Hawthorne, 1972). Too much emphasis is placed on the tests and poor results are seen in terms of racial imbalance and lack of teacher accountability. Dr. Clark (member of the Board of Regents) opposed the abolition of the Regents but stated that the examinations should be less predictable in order to prevent teacher from teaching tests (Fleishman Report, 1974). Friedman (1964) points out that the policy of requesting teachers to file final grades a few days before students take Regents exams is unfair to students and teachers because it does not promote accurate sppraisal of students' achievement. Crewson (1964) also argues that it is impossible to get a fair appraisal of students who take these exams. He further contends that since students' grades are already in before taking the exams, many students will therefore perform below their capacity. Students know that they will not fail the course if they get a mere 65 on the Regents. Therefore, it is impossible to accurately evaluate learning over the period covered by the exams.

Crewson (1964) suggests that the grading policy should be changed so that teachers wait until the Regents exams papers have been graded before they submit final grades for students. Still others argue whether there should be statewide standards at all of the type represented by the Regents examinations. Those in favor of standards see the Regents exams as the key features. Critics say Regents examinations are inadequate as standards in that they don't measure in all other subject areas or at all grade levels for other school objectives such as pupils' affective development (Inside Education, 1972). These same critics also say that taking Regents exams are old rituals in which the Board of Regents acts as the overseer to maintain a uniform curriculum throughout the state. However, most people are not aware of the Regents examinations and their effects upon teaching (Littlefield, 1972). Stafford (1968) and other critics point out that the Regents exams don't provide a measure of school or teacher performance, and don't lead to corrective action in the school in the big cities where most of the learning prolems exist.

Proponents, on the other hand, contend that the Regents exams are recommended to the schools for general supervision purposes as well as partial measures of achievement for students. These proponents further maintain that when the exams are used for the right purposes, they are valid and reliable instruments, bearing in mind that they are used to measure only some aspects of selected students. They further claim that research has shown that the Regents exams are excellent devices for measuring probable success in future study. Those whose oppose the exams because of their general supervisory purposes claim that administrators evaluate a teacher solely on his or her students' Regents exam marks. They point out that the tests are over emphasized by some teachers and create undue tensions among students. Another claim is that since the exams results are reviewed by the state's Education Department staff, the review of rating marks makes the Regents examinations scores criteria for judging teacher competency and for holding teachers accountable.

It has been argued that the Regents exams are necessary as evaluation devices to measure quality instruction in the state and that they should be used to evaluate teacher competency. In some cases teachers as well as students have been evaluated solely on the basis or chiefly on the results from the Regents exams (Stafford, 1968). Although there may be a close relationship between teachers' ability and the proportion of students who pass the exams, if students are not properly prepared, teachers should not be blamed for students' failure. Teachers often have little control over the qualifications of the students who are placed in their classes; therefore, success of an individual teacher or school could not be properly measured in terms of Regents examinations results (Rafferty, 1976). There are other factors such as scheduling conflicts, parental and peer group pressure, poor guidance, and poor placement that may cause students to fail. Thus, evaluation of teachers by the results of Regents examinations is inaccurate and unjust.

Minotti (1952) argued that if used properly and legitimately, the Regents examinations can be used as diagnostic and remedial devices and can be employed to improve teaching. He points out that questions from previous tests can be used profitably. These questions can be used for periodical checks on progress, learning content, and developing skills. In addition, the use of the Regents can be used for admissions, classifications, and promotion of students. However, it is the responsibility of the individual school to use the exams as the school sees fit. Any misuse of the tests is the fault of the schools, not the Regents examinations (Cornell, 1966).

The exams are useful because they provide high schools, guidance counselors and administrators with valuable information concerning the probability of students' future academic progress. In addition, the exams also give schools measuring instruments to use to reassure themselves that students are getting the quality education they deserve.

In 1972, the New York State Education Department commissioned a study on the quality and cost of education in New York. This commission known as the Fleishman Commission issued its findings in 1974. The Fleishman Commission recommended that the Regents examination system be abolished (Fleishman Report, 1974). In its findings the Commission found that Regents failure in the large cities is dangerously high. This was especially true for New York City where more than one out of three students failed Regents examinations. By contrast, in village districts to which the wealthy suburbs belong, only one out of nine students, on the average, failed Regents examinations. However the Board of Regents of the Education Department voted to retain the Regents examinations and continue them as final exams on a subject to subject basis in 21 subject areas (Buder, 1974).

The Education Department examined the scores (Fleishman Report, 1974) of other standardized high school levels, and comparing the scores to Regents examination results, found that although all scores had declined, the results of students' performance on New York tests were not much different from other national standardized tests. The Board of Regents also sought to establish a competency testing program (Cummings, 1976). In 1978, the Board of Regents established the Regents Competency Test--a minimum competency testing program making it possible for all high school students to take statewide Regents examinations. The official announcement of this testing program meant that beginning June 1979, no high school senior would be awarded a diploma without passing a minimum competency test (Regents) in reading, writing, and mathematics.

A passing grade on the "traditional" algebra Regents can be used in lieu of passing the Regents Competency Test (RCT) in mathematics. Implied in the establishment of the new Regents Competency Test (RCT) is that competency tests are designed for minority students in the inner cities while the "traditional" Regents examinations remain the exclusive examinations of suburban middle class White students. So the controversy over the Regents has now taken a new focus. However, it is beyond the scope of this study to delve into the Regents Competency Tests versus the "traditional" Regents examinations controversy.

PREPARATION OF ALGEBRA REGENTS EXAMINATIONS

The ninth year algebra Regents examinations, part of the statewide Regents testing program, are given three times a year, in January, June and August. These exams are prepared in Albany, New York at the State Education Department by a committee of one college professor, and five experienced classroom teachers. The committee meets with a state supervisor and staff to formulate questions for the examinations. The major source of the questions for the tests is from the syllabus provided by the Education Department. Teachers trained in test item construction actually formulate the preliminary test questions. The test items go through a series of checks set up by the Education Department as guidelines for the Mathematics Committee. After the Committee has completed the tests, they are carefully reviewed by other teacher consultants, by the Mathematics Supervisor of the State Education Department and two associates, by a testing specialist, and by the Education Department editors who often rewrite and revise many of the questions on the examinations.

The tests are then pretested on a sample of junior high and senior high school population enrolled in algebra throughout the state. Questions that survive the sample exams are critically reviewed by a committee of teachers who teach algebra, and this group determines the final selection of items that compose the examinations. The examinations are then duplicated and answer keys to the tests are prepared by the staff at the Education Department. After the exams are printed, they are stored in a guarded building at the Education Department. In the early part of the month in which the tests are given, they are sealed, dated clearly, and sent to principals throughout the state who store them under lock and key. Only once in 100 years has there been reported theft of these examinations (Dembart, 1974; Buss and Novick, 1980).

The examinations remain under lock and key in the principals' offices of the schools until the actual date and time the examinations are given. The teachers administering the examinations are the ones who open the sealed envelopes containing the tests. The testing period lasts for three hours. After taking the tests, the students must sign an oath of truth attesting that they had not seen the contents of the tests nor had any previous information of the examinations.

The examinations are then graded by a committee of teachers under the supervision of the principal of each school. Afterwards, in 48 hours, the corrected examinations are to be returned to the State Education Department by each individual school. About 20% of the examinations are called for review and are re-rated by the State Education Department raters. Each individual school receives a notice of variation which includes information on how many of the exams were reviewed, how many students passed, how many students failed, and whether or not any of the questions graded by the teachers were incorrectly scored. In addition to the notice of variation, the principal of each school receives from the State Education Department a Percentile Equivalent and Reliability Data report. This report is offered as a means of interpreting the relative value of the Regents exams scores. What is focused upon in this report is the achievement standard established by the pass mark. The report shows the distribution of the Regents examinations scores, the number of students taking the examinations throughout the state, and the percentage of students passing the examinations throughout the state.

In conclusion, it appears that the Regents examinations will continue to be a vital part of the testing and educational measurement of students in New York State. It is obvious that Regents examinations may be used for positive as well as for negative purposes. Even with all of their imperfections, it is apparent that these examinations are useful educational instruments and are valuable sources of information. The examinations are of value to guidance counselors because the exams provide a better picture of the strengths and weaknesses of students. The examinations provide the teachers with additional information concerning students' progress, and aid in helping teachers evaluate and improve instruction. The exams also provide principals and supervisors with information concerning the relative achievement of students in their schools in all branches of instruction, thus the exams aid in administrative planning. Furthermore, the exams supply college admission offices with meaningful information concerning individuals' past achievement and future potentialities, to aid in college admission and planning. The Regents examinations like any other tests are extremely valuable measures for providing objective information about individuals and groups when the limitations inherent in the test interpretations are carefully understood. Any test which reduces or eliminates bias in evaluation or selection permits comparison between and ranking of students. Such instruments also serve as predictors of future success. Regents examinations like other tests enable us to ask informed questions about students, especially when large discrepancies exist between students' performance on tests and actual class performance.

Regents examinations also provide better understanding of student achievement and progress and act as a basis for more intelligent educational and vocational planning. Many gifted students who are inner city students may be discovered and saved from the sea of frustration by their performance on the Regents examinations. These students may be doing average or below average work, but if they successfully pass a Regents examination, their ability may be recognized. Thus a study of minority student performance of the Regents examination is important and needed because such research will contribute to the total perspective of the forces which influence the education of minorities.

STUDIES RELATED TO REGENTS EXAMINATION

A brief perusal of the literature on Regents examinations indicates that most of this writing has been in the form of magazine articles and essays. Much of this literature has centered around the controversy of eliminating all Regents. Also, these articles have dealt with the use of the Regents as predictors of future success (Mauro, 1975) or general implications of the Regents (Claude, 1964; Crewson, 1964; Donley and Daggett, 1962; Emerson, 1964; Friedman, 1964; Goldberg, 1967; Iman, 1968; Littlefield, 1972; Milham, 1966; Miller and Mallinson, 1952; Stafford, 1968). A few studies have concerned Regents examinations in subject areas other than algebra. Stone (1960) reported that the social studies Regents should be eliminated because of its over emphasis of American History to the neglect of other areas of history. He also recommended that the Regents are a waste of the taxpayers money and should be abolished. Ladd (1972) made an analysis of the inquiry level of the earth science Regents and found that this examination needs to be revised because of the nature of the change in curriculum. Passero and Schmeltz (1972) like Stone and Ladd also concluded that the earth science Regents has not kept pace with the times. Madeo (1968) and Stafford (1968) both investigated English and reported that this Regents should be abolished. Lalor (1977) and Lehrman (1977) after investigating the physics and science Regents over a period of 10 years (1966-1976) concluded that these examinations contain many errors and need to be reconstructed. Owens (1964) investigated the bookkeeping Regents and his findings indicated that this Regents was too lengthy. Milham (1966) in examining tabulation on the bookkeeping Regents concluded that this examination was too one-sided in overemphasizing one aspect of bookkeeping; therefore, it should be abolished. Gleichehaus (1965) concluded that too much time was spent on preparation for the stenography Regents and proposed ways to pass this examination in five months.

However, a few studies related to Regents examinations dealt with factors used in predicting success on Regents. H. Gould (1955) made a study of predicting biology Regents grades from students' personality and concluded that six components of personality were signigicant predictors of students' success on the biology Regents. H. Gould also reported that these personality components were more reliable than students' previous science grades or I.Q. scores in predicting students' success on the biology Regents. Purcell (1972) investigated the relationship of students' classroom marks and Regents exam marks to teacher knowledge of students' standardized test scores and found that when teachers were given the students' profile and standardized test data, the students' mean classroom and mean Regents marks were significantly different. He concluded that teachers' knowledge of students' standardized test scores was a significant factor in predicting students' success on Regents examinations. Faux (1980) investigated certain criteria on criterion reference tests and found a high correlation between comprehension and vocabulary skills with success among students of Regents Algebra. Although there has been little research on predicting success in Regents Algebra, much research has been conducted on predicting success in algebra.

STUDIES RELATED TO PREDICTIVE FACTORS OF SUCCESS IN ALGEBRA

In recent years many studies have been concerned with predicting students' success in algebra. However, many of these studies concern factors of prediction which have been used in prior studies which date back to the late 1920's and early 1930's. In addition, most of these studies have been limited to affluent suburban areas and have not concentrated on the inner city schools. Intelligence Quotient-I.Q. (Armstrong, 1964; Barnes and Asher, 1962; Callicut, 1961; Dinkel, 1959; Ditcher, 1933; Douglas, 1935; Duncan, 1960; Erwin, 1978; Haddock, 1927; Hanna and Bligh, 1969; Ivanoff, Evermode and Praem, 1965; Layton, 1941; McGarvey, 1962; Meserve, 1962; Messler, 1961; Lovett, 1969; Orleans, 1934; Rosilda, 1951; Saber and Feldt, 1969; Shaw, 1956; Short, 1927) was one of the first criterion investigated as a predictive measure of algebra success. The results of the early studies such as Ditcher, Haddock and Short indicated that I.Q. was a valid predictor of algebra success. However, with the exception of the studies by Dinkel and Hanna and Bligh, the findings of all of the other studies revealed that I.Q. is not a valid predictor of success in algebra.

Other variables such as sex (Aikens, 1974; Anthony, 1978;

Byrd, 1980; Sims, 1979), and race and ethnicity (Byrd, 1980; Forman, 1980; Forshay, 1977; Houston, 1980) were used as predictive variables of algebra success. From the evidence of these studies, race and ethnicity were found not to be good predictors of success in algebra. However, Houston and Sims concluded that sex was a significant factor in forecasting algebra success among college students. Byrd on the other hand found no significant relationship between sex and algebras success. Age and maturity (Baker, 1962; Byrd, 1980; Degraff, 1962; Forman, 1980; Fowler, 1961; Layton, 1941; Lovett, 1969; Messler, 1961; Sims, 1979), level of cognitive development, and personality factors (Cain, 1966; Chansky, 1966; Dinkel, 1959; Erwin, 1979; Forman, 1980; Forshay, 1977; Fremont, 1972; Herrington, 1978; Houston, 1980; Reed, 1978; Smith, 1970) were also investigated as variables of algebra success.

From the evidence of these studies, age, maturity, and level of cognitive development were found to be significant factors in predicting success in algebra. Personality was found by some investigators as a valid predictor, however, Forshay (1977) found no evidence of personality as a reliable instrument in predicting success in algebra.

Several other variables such as ability grouping and individualized programmed instruction (Hegstrom and Riffle, 1963; McGarvey, 1962; Nichols, 1962; Taylor, 1972) were also shown to be predictors of algebra success. Students' attitudes (Aikens, 1970; 1974; Byrd, 1980; Englert, 1972; McConnell, 1979; Sims, 1979; Taylor, 1972) and study habits (Byrd, 1980; G. K. Gould, 1977; Hegstrom and Riffle, 1963) were found to be valid predictors of algebra success. Anthony (1978) and Garner (1979) concluded that the amount of time spent doing homework assignments was a reliable factor in determining success in algebra.

Rodrigue (1979) as had G. K. Gould (1977) sought to compare student achievement with class scheduling. Rodrigue sought to determine if the time of the day in which classes were taught was a significant factor of students' success in Algebra I. Her study was conducted in the public schools of La Founce Parish in Los Angeles during 1978-79. The subjects consisted of junior and senior high school students enrolled in Algebra I. The population was divided into six groups corresponding to six teaching periods of the day. Each group was pretested and taught a unit in solving algebraic equations. Upon completion a post-test was administered. Raw scores were collected from the pre- and post-tests and used as a basis of the study. A t test was used to determine if differences between group means were significant. Rodrigue formed the null hypothesis which was that the time in which classes are taught is not a significant factor of student achievement in algebra. The t test located significant differences and the null hypothesis was rejected. Rodrigue concluded that the time of the day was a significant factor of student achievement in Algebra I. The investigator also concluded that within limitation, that it was more advantageous with respect to student achievement to schedule Algebra I at the first or fifth period of the day. The fourth and sixth periods were least advantageous.

In addition to the above factors, variables such as teachers' recommendations or estimates (Erwin, 1978; Lovett, 1969; Messler, 1961), algebra aptitude tests (Ayers, 1934; Barnes and Asher, 1962; Dinkel, 1959; Duncan, 1962; Guiler, 1944; Ivanoff et al., 1965; Kertes, 1939; Kovaly, 1980; Layton, 1941; Lee and Hughes, 1934; Reed, 1978; Saber and Feldt, 1968; Seagoe, 1938; Shaw, 1956; Torgerson and Aamodt, 1938) and eighth grade math marks (Callicut, 1961; Chapman, 1959; Clifton, 1940; Dinkel, 1959; Erwin, 1979; Hanna and Bligh, 1969; Hegstrom and Riffle, 1963; Kovaly, 1980; Layton, 1941; Mogull and Rosengarten, 1952; Morris, 1940; Reed, 1978; Seagoe, 1938) were examined as predictive factors of success in algebra. In all of the above studies with the exceptions of Dinkel and Hanna and Bligh, eighth grade math marks were found to correlate highly with success in algebra. Teachers' recommendations or estimates were reported to show a moderate correlation with algebra success. Reading test scores (Byrd, 1980; Dinkel, 1959; Duncan, 1960; Eagle, 1948; Faux, 1980; Fay, 1950; Kraft, 1946; Lovett, 1969; Reed, 1978; Shaw, 1965; Sommerfeld and Tracey, 1963, and a number of others) were shown to have a predictive validity in forecasting success in algebra in all of these studies with the exception of Dinkel and Duncan.

A final variable used to predict success in algebra was previous or eighth grade math achievement test scores (Baker, 1962; Byrd, 1980; Callicut, 1961; Chapman, 1962; Douglas, 1935; Erwin, 1979; Faux, 1980; Fowler, 1961; Guiler, 1944; Hanna and Bligh, 1969; Hegstrom and Riffle, 1963; Layton, 1941; Lovett, 1969; Meserve, 1962; Purcell, 1972; Reed, 1978; Rosilda, 1951). The findings of these studies with the exception of Dinkel and Hanna and Bligh reveal that previous or eighth grade achievement test scores are very reliable criteria for predicting success in algebra.

Algebra Aptitude Tests and Algebra Success

Studies that used algebra aptitude test scores as a predictor of success in algebra are the early studies of Ayers (1934), Guiler (1944), Kertes (1939), Layton (1941), Lee and Hughes (1934), Morris (1940), Orleans (1934), Rosilda (1951), Seagoe (1938), Torgenson and Aamodt (1933). All of these studies reported that algebra aptitude test scores do contribute significantly in predicting algebra success. However, of these studies, only Guiler reported that algebra prognostic test scores were the most valid predictors of success in algebra among the variables used.

The study by Guiler (1944) was conducted to discover comparative values of certain standardized measures and algebra aptitude. Three predictive measures (algebra aptitude test scores, an arithmetic achievement test and the Chris survey test) were used. The subjects consisted of 75 pupils in high school in Marion, Ohio. The students were administered the Brelish Algebra Survey Test at the end of a semester of work in algebra. By using correlation techniques for discovering relationships between the predictive measures, the results showed correlation between algebra aptitude test forecasted achievement better than the scores on the other two predictive measures. More recent studies such as the one by Barnes and Asher (1962), Dinkel (1959), Duncan (1960), Erwin (1978), Hanna and Bligh (1969), Ivanoff et al. (1965), Kovaly (1980), Reed (1978), Saber and Feldt (1968), Shaw (1956) and Wick (1965) also reported that algebra aptitude test scores were valid predictors of algebra success, yet Dinkel (1959), Erwin (1978) and Ivanoff et al. (1965) are the only investigators who concluded that algebra aptitude test scores were the best predictors of algebra success among the variables used in their studies.

The Dinkel (1959) study was a detailed study of his algebra classes in Culver City, California. Dinkel wanted to know who should study algebra and when the study should begin. He used 148 cases as subjects and derived a correlation of .78 between algebra aptitude test scores and algebra success. In addition to using algebra test scores, he used I.Q. test scores, arithmetic test scores, and previous grades. Dinkel concluded that the algebra test scores were more significant in forecasting algebra success than were previous grades in math, arithmetic test scores, or I.Q. Duncan (1969) used 21 variables among them an algebra aptitude test, but unlike Dinkel, Duncan found that the scores on this test provided little significance in predicting success.

Barnes and Asher (1962) in attempting to find out who should or should not be advised to take algebra conducted a study in a typical middle class suburban community. The problem of their study was how to best make the selection of students on the basis of a large number of variables such as previous grades, achievement test results, I.Q. results and an algebra prognostic aptitude test results. The guidance department of this study used students eighth grade math grades and an algebra prognostic test as the two major factors in predicting students' success, thus selection of students for algebra. Data were gathered from the students' records so that there were eleven variables (9th grade algebra grades, the criterion variables, 7th grade math grades, 8th grade math grades, 7th grade reading grades, I.Q., 7th grade, Grade Equivalent (G.E.) scores on the arithmetic part of 7th grade achievement test, G.E. scores of 8th grade achievement math test, G.E. on reading test in 7th grade, G.E. on reading test in 8th grade, and raw scores on the ORN Algebra Prognosis Test in the 8th grade).

A multiple regression equation was developed to predict ninth grade algebra marks. There were 192 students with six different teachers from two junior high schools. In their analysis, these investigators found that the ORN Algebra Prognosis Test did not detract from prediction but added little by way of being a good predictor of success in algebra. Barnes and Asher concluded that the best single prediction of success in algebra was eighth grade math marks. This finding corroborated those of Layton (1944) and Callicut (1961). In addition, Barnes and Asher concluded that arithmetic achievement test scores were the only factor which greatly increased the multiple correlation.

Ivanoff et al. (1965) conducted a study among 448 freshman high school students in an attempt to determine whether or not students should be placed in ninth year algebra or general math. These investigators used I.Q. scores on the Orleans Algebra Prognostic Test and grade placement in arithmetic computation of a standardized test taken in the eighth grade. Ivanoff et al. attempted to determine whether or not the prediction variables I.Q., the algebra prognostic measure, and the arithmetic computation could differentiate between algebra and non algebra students. They found that arithmetic test scores and eighth grade marks do corroborate. However, they found no significant relationship between the two groups as far as the algebra prognostic aptitude was concerned.

Hanna and Bligh (1969) compared the validity of a special algebra prognosis test, I.Q., teacher predicted algebra grades, and previous math grades in predicting algebra success. Their method included 1,105 eighth grade math students in nine different schools. Their results indicated that teachers' predicted grades added significantly to the prediction of algebra success.

Furthermore their findings indicated as had those of Dinkel (1959) that math grades added nothing to the criterion of success. Also contrary to the findings of Duncan (1960), Barnes and Asher (1962), and Ivanoff et al. (1965), the use of the algebra prognostic aptitude test added significantly to success while the use of the math grades added nothing to the situation. The findings of other studies by Reed (1978), Saber and Feldt (1969) and Shaw (1959) reveal little predictive validity between algebra success and prognostic algebra aptitude test scores.

Erwin (1978) conducted a study using a total of 558 ninth graders in a high school in suburban Chicago. The purpose of the study was to determine the ability of seven measures (self-esteem, I.Q., reading scores, eighth grade math marks, teachers' estimate of each student's attitude toward math, algebra aptitude test scores, and arithmetic computation skills) in predicting success in algebra. Erwin concluded that all variables correlated as a whole, but algebra aptitude test scores were the best single variable for predicting success in algebra.

Reading and Predicting Algebra Success

The use of reading and reading test scores as predictive variables in math and algebra is found in early studies like the one by Kraft (1946) who found a significant correlation between reading and sixth grade mathematics. Fay (1950), on the other hand, found no significant relationship between specific reading skills and selected areas of math achievement among sixth graders.

Eagle (1948) while investigating the relationship between certain reading abilities and success in math found no evidence that improvement in general reading comprehension and general vocabulary would increase proficiency in eighth grade mathematics, ninth grade algebra or general mathematics. Shaw (1956), however, in seeking a successful prediction device for success in algebra hypothesized that since algebra requires reading, for instance, in verbal problem solving, a correlation between success in algebra and reading ability must exist, and the scores on a reading test might be an aid in predicting algebra success. Using factors such as I.Q., reading scores, and algebra aptitude test scores in various combinations, Shaw concluded that reading scores are valid predictors of success in algebra and has a high correlation with algebra achievement.

The studies by Dinkel (1959), Duncan (1960) and Ivanoff et al. (1965) indicated no usefulness of reading test scores as valid predictors of algebra success. Barnes and Asher (1962) concluded that seventh grade reading test scores were valid predictors of success, but eighth grade reading scores showed only a slight correlation with success in algebra. Call and Wiggins (1966) pointed out that reading was essential to the study of mathematics and like Shaw (1956) concluded that reading test scores can be an aid in predicting algebra success. Sommerfeld and Tracey (1963) and Lovett (1969) used reading scores among the variables in their studies and concluded that these criteria are valid predictors of success in algebra.

In addition to the investigators, Mogull and Rosengarten (1972) found that seventh and eighth grade reading scores show only slight predictive validity of algebra success. Erwin

(1978), however, found a significant correlation between success in algebra and reading scores. Byrd (1980) in examining success in algebra among college students used reading comprehension test scores as variables. Byrd like Sims (1978) concluded that reading comprehension test scores are among the best variables in predicting students' success in college algebra.

Finally, Faux (1980) conducted a study in the Spencerport school district in upstate New York from 1975-1978. The purpose of the study was to determine whether process-based criterion reference tests or one of the subtests (comprehension and vocabulary skills) would better predict students' success in ninth grade math than the present system. The present system was to place students in one of three ninth grade math courses (Regents Algebra, Informal Algebra or General Math) on the basis of the math portion of the Metropolitan Achievement Test (MAT), I.Q., and students' overall grade average in the eighth grade. His subjects consisted of a group of ninth graders and a group of eighth graders who were enrolled in Regents Algebra. Faux concluded that the comprehension and vocabulary subtests along with the math portion of the MAT were the best three predictive variables for success in Regents Algebra. However, the math scores were the best single prediction of the three variables.

Eighth Grade Math Performance and Predicting Algebra Success

Eighth grade math marks and eighth grade math achievement test scores were used to predict success in algebra in the early studies by Clifton (1941), Douglas (1935), Guiler (1944), Layton (1941), Seagoe (1935) and in more recent studies such as the ones by Baker (1962), Barnes and Asher (1962), Callicut (1961), Chapman (1962), Dinkel (1959), Duncan (1960), Erwin (1978), Faux (1980), Fowler (1961), Hanna and Bligh (1969), Hegstrom and Riffle (1963), Ivanoff (1965), Kovaly (1980), Lovett (1969), Messler (1962), Meserve (1962), Purcell (1972), Reed (1978) and Rosilda (1951). With the exception of Dinkel, Erwin, and Hanna and Bligh, all of the more recent studies point out that eighth grade math marks and eighth grade math achievement test scores contribute significantly to predicting success in algebra. Eighth grade achievement test scores, however appear to have less predictive validity in forecasting success than eighth grade math marks. Layton in examining certain prognostic instruments in algebra was concerned with devising some means whereby those students who are not capable of doing the work of algebra would be placed in a course that would prove profitable to them. Specifically his study was conducted in a junior high school in Jackson, Mississippi in 1938-1939. His subjects consisted of 114 ninth graders. Layton selected standardized test scores, previous eighth year math grades, I.Q. and chronological age as criteria for predicting success. Prognosis were attempted by two methods to determine how these factors correlated with algebra success. Although Layton had hypothesized that I.Q. would be significant in predicting success, the results showed otherwise. His findings showed that eighth grade math marks were the most valid criteria for predicting individual success in algebra.

Callicut (1961) conducted a study to determine the relationship between success in algebra and four variables (I.Q., math achievement test scores, eighth grade composite scores and eighth grade marks). His subjects consisted of 50 ninth grade algebra students. His data were collected from students' cumulative records. He defined mastery of degrees of success in algebra by students passing the first marking period. The results of Callicut like those of Layton (1941), Rosilda (1951) and Shaw (1956) showed a high correlation between eighth grade math grades and achievement in algebra. Callicut also concluded that eighth grade math marks were a better basis for prognosis than eighth grade composite grade average, I.Q. or achievement test scores.

Other investigators such as Baker (1962), Chapman (1962), Lovett (1969) and Meserve (1962) concluded that math achievement tests were as valid as were eighth grade math marks in predicting potential success in algebra. Fowler (1961) who investigated achievement test scores and their relationship to maturity, concluded that math achievement test scores were good predictors of algebra success. Fowler sought to answer whether eighth graders score as well on achievement tests after one year of instruction in algebra as do ninth graders. At the end of one year of algebra, Fowler administered the Cooperative Algebra Test to five classes of eighth graders and five classes of ninth graders. His results showed that eighth graders scored as well as ninth graders on the test. Baker (1962) in a report of a study to identify junior high schools in Michigan providing special instruction for students in talented math concluded that standardized achievement test scores were valid predictors of algebra success. In addition to these studies, Kovaly (1980) attempted to identify which of those specific variables or their combination could best predict success in ninth year Algebra I. The three independent variables used in the study were grade eight teachers' prediction of a final algebra grade, a score on a predictive instrument and eighth grade math performance. The measure of success was a final grade of B or better. There were 30 items on the predictive instruments which was designed by the investigator to measure students' abilities in comprehension of symbolic content, understanding math content, comprehension skill, and application of correct algorithms. This investigator wanted to determine whether the three predictors alone or in combination discriminated between students who succeeded in algebra and who did not. If they did, what were the valid or invalid predictors contributing to discrimination? The results showed that all three predicting variables contributed significantly to the discrimination between the groups of Algebra I students. Kovaly concluded that the three predictors can be used to identify those students who might be successful in ninth grade algebra.

CONCLUDING REMARKS

In all of the published studies many approaches have been attempted to find valid predictors of success in algebra, yet only one (Faux, 1980) relates to predicting success on the algebra Regents. The paucity of information related directly to predicting success on the algebra Regents perhaps lies with the controversy surrounding the Regents. Most of the studies which deal with Regents focus on revision or elimination of the Regents. A few studies such as the one by H. Gould (1955) do concern predicting Regents grades and success in biology. Purcell (1972) also examines students' success on Regents as related to teachers' knowledge of students' standardized test scores. However, these studies do not focus on inner city students.

In summary, the published studies revealed that many variables for predicting algebra have been investigated. The variables can be classified in many different ways such as academic (math and reading achievement test scores, algebra aptitude test scores, previous grades); psychological (I.Q., self-esteem, personality, level of cognitive development, attitudes, perception); socio-economical (age, maturity, sex, race, ethnicity); structural (study habits, class scheduling, ability grouping, individualized programming, homework, time of day) or a number of other ways. From the results of these studies, no conclusive statement can be made concerning the relationship between each variable and predicting success in algebra. The use of many variables or the use of only a few variables has no effect on the predictive validity of what may be the best predictor of algebra success.

As can be seen, there is little consistency in the findings of most of the studies using the same variables. Researchers using the same variables found different predictive validity among the variables. However, it does appear that previous math grades are the single most valid predictors of forecasting success in algebra. From all of the studies in which eighth grade math marks were used only two studies (Dinkel, 1959; Hanna and Bligh, 1959) reported that eighth grade math marks were not valid predictors of success in algebra. Scores of a good algebra aptitude test, reading scores, and math achievement test scores also seem to have high correlations with success in algebra. Still classroom factors such as scheduling, homework and study habits are good predictors of algebra success, while sex, race and ethnicity do not appear to be good or valid predictors. Whether or not there is a single best predictor or a combination of variables seems to depend upon what the individual investigator identifies or considers the most important factor to investigate in predicting success in algebra. The single best predictor seems to be one of the choices made by the researcher from among the variables he/she used in his/her study.

In conclusion, on the basis of all of the findings of these studies it does appear that success in prior math courses is a better predictor of success in algebra than general intellectual ability. Furthermore, different measures of specific abilities predict success in algebra (Begle, 1975), and no one variable or any specific set of variables predict success in algebra for all algebra students.

CHAPTER III

RESEARCH DESIGN AND PROCEDURES

As was mentioned previously, the purpose of this investigation is to provide an answer to the question whether of not assigning students to algebra by math score rather than by reading scores will enable a greater percentage of students to pass the algebra Regents. In addition, answers are sought to the questions to what extent students' awareness of the nature and purpose of the Regents teachers' recommendations and other factors predict success on the algebra Regents examination. To carry out this purpose, 36 subjects were selected for the study.

Subjects

The subjects were a class of 36 junior high school ninth graders at the Sands Junior High School in New York City. The New York City Board of Education's "Eleventh Annual Ranking of Schools by Reading and Mathematics Achievement" (June, 1980) listed this school as having 41% of the students at or above the national standardized reading grade level, and 29% of the students at or above the national mathematics grade level. The ethnic composition of the school for 1980-1981 school year was about 75% Black, more than 24% Hispanic and less than 1% White. The few White students attending this school were seventh and eighth graders in a special satellite program conducted by the district in which this school is located. The age range of the subjects was 13-15 years. There were 20 female and 16 male students in the sample. The mean reading and math scores were typical for inner city junior high schools in New York City. Although there were originally 36 students selected for the study, at the end of the experimental phase, there were only 31 students remaining because five students had been discharged or transferred to other schools in the district. Three students left at the beginning of the second month, and two other students left at the end of the second month. In addition, early in the experiment, two other students were transferred to other schools in the district and at the same time two new students admitted from another school within the district were assigned to the class.

The basis of selection of the subjects was by achievement tests scores on the California Achievement Test. Twenty-four subjects were chosen by math scores and twelve were chosen by reading scores.

Instruments

The California Achievement Test (CAT), form D and the Science Research Associates Achievement Test (SRA), Level E were the two standardized achievement tests employed in the investigation. Both of these tests are well-known national tests which measure students achievement in mathematics and reading. The CAT consisted of two subtests in mathematics (computation and application skills). Its reading subtests are comprehension and vocabulary. The SRA subtests in mathematics are computation, concepts and problem-solving. The concepts and problem-solving sections of the SRA are analogous to the application section of the CAT. In addition to these measures, a survey questionnaire developed by the investigator (see Appendix A) was used to obtain background information on the subjects as well as to gather data concerning students' awareness of the nature and purpose of the Regents examination. Giving all the correct responses to questions 29, 30, 36, 41, 42, 43, 44 and 49 indicated that these students were aware of the nature and purpose of the Regents. A score of one (1) was assigned to those students who answered all of the questions correctly. Students answering any of these questions incorrectly received a score of zero (0) indicating that they were not aware of the nature and purpose of the Regents. The other information on the questionnaire relate to general questions concerning students' attitudes and study habits toward algebra. These questions though not directly related to the present investigation supplied the researcher with additional information if needed. Another reason for the additional questions was to provide a variety of questions in order to help fill in the time since a full class period (45 minutes) were devoted to administering the questionnaire. In addition, the variation in questions helped relieve students of monotony.

Teachers' recommendations forms (see Appendix B) were also designed by the researcher. These simply were forms requesting each eighth grader teacher to recommend or not recommend particular students for algebra in the ninth grade. Each teacher was interviewed by the researcher and told that the bases for selection were teachers' perception of students' performance in class, students' expected final grade, and teacher's judgment whether or not he or she "felt" the students would succeed in algebra. Teachers' final math grades recorded in the 1979-1980 school year were a fourth measure used in the study. The New York State High School Regents (Ninth Year-Mathematics) was the final measure used in the study. This examination contains 37 questions on topics found in elementary algebra curricula. The test is designed to measure students' knowledge and skills in certain algebraic operations such as numeration, word problem-solving, factoring, graphing, algebraic fractions, variables, equations, the Pythagorean Theorem, ratio, proportions, inequality, geometric concepts employed in solving algebraic problems, and basic trigonometric relationships. The test has three parts. Part I consists of 20 short answer questions which the students must compute and write their answers on the spaces provided. Part II consists of 10 multiple choice short answer type examples. Each correct response to questions in Parts I and II is worth two credits, thus accounting for 60% of the test. Part III of this Regents examination consists of seven long-answer, problem-solving type questions. The students must select four out of the seven questions. Each of these questions is worth 10 points and partial credits is awarded for this part of the test. The test is scheduled to last three hours.

PROCEDURE

The subjects were administered the CAT examination in April, 1980 for the purpose of acquiring their math and reading scores. Twenty-four students were selected because they obtained the highest math scores. Twelve additional students afterwards were selected because they had the highest reading scores among the remaining eighth grade students in the school. The overall mean scores on the CAT for the subjects was 8.5 in mathematics and 7.3 in reading. The subjects were assigned to Group I if they were selected by math scores and Group II if they were selected by reading scores. The subjects were identified by the first five digits of their school's student identification numbers.

The SRA overall mean score in mathematics was 6.5 for all of the subjects. The subjects were not given the reading portion of the SRA. The SRA was administered early in June, 1980 because of the questionable nature surrounding the administering of the CAT in New York City. The SRA was selected also because it correlated well with the learning objectives of this school's district. However, the difficulty surrounding the questionable administration concerning the CAT scores was resolved in late June, 1980. When this happened, the scores on the SRA were discarded from the study. The researcher also made this decision based upon the status of the SRA scores. It was discovered that in scoring the SRA test, the school's mini-computer was malfunctioning. Time did not allow for rescoring the math test of the SRA and for administering the SRA subtest in reading.

Teachers' recommendations forms when tabulated showed that there were 20 subjects recommended for algebra and 16 were not recommended. The survey questionnaire was administered at the end of the first month of instruction. The YES and NO responses were tabulated and 23 students were aware of the nature and purpose of the Regents while 13 were not.

The subjects attended algebra class five times a week during the first period each day. The mode of instruction was conventional teaching consisting of lecturing, class discussion, and recitation. At the end of the experiment because of attrition 31 subjects remained. Of these 29 took the Regents examination in June, 1981; two were absent and no provisions were available for make-up examinations. A Regents make-up is possible only at the next regular administering of the test, in this case, August 1981. Of the 29 who took the test, 20 were in Group I and 9 in Group II. The Regents examination which lasted for three hours was taken two days before graduation for the ninth graders in this school. Of the 29 subjects taking the examination, 23 received passing grades of 65% or higher. In other words, about 80% of the students passed the examination. Scores from the Regents were obtained from the students' grading sheets before being sent to the New York State Department of Education.

STATISTICAL TREATMENT

A stepwise multiple regression analysis was conducted to calculate the coefficients of interrelationships for the seven independent variables and the dependent variable. By using the Statistical Package for the Social Sciences (SPSS), a multiple regression equation, multiple R's and other regression data were calculated. In addition, the Pearson product-moment correlation method was used to calculate the correlations among the variables. F tests and t tests were also conducted to answer questions raised by hypotheses. All findings were arbitrarily selected at the .05 level of confidence when tested against the null hypothesis.

HYPOTHESES

Hypothesis I

Regents scores of students assigned to algebra by math achievement test scores will be significantly higher than Regents scores received by students assigned to algebra by reading achievement test scores.

Hypothesis II

Students' awareness of the nature and purpose of the Regents examination will have a significant positive correlation with predicting success on the examination.

Hypothesis III

Eighth grade teachers' reported math marks are not reliable predictors of success on the algebra Regents examination for inner city junior high school students.

Hypothesis IV

Mathematics grade equivalent average scores will be the single best factors in predicting success on the algebra Regents for inner city junior high school students.

Hypothesis V

Teachers' recommendations are significant factors in determining success on the Regents examination.

Hypothesis VI

Students grade equivalent average scores on standardized math tests correlate higher with Regents grades than do math computation scores.

Hypothesis VII

The correlation between math grade equivalent scores and Regents grades is higher than the correlation between Regents grades and math application scores.

CHAPTER IV

ANALYSES OF THE DATA

The data were analyzed by correlation techniques using the Statistical Package for the Social Sciences (SPSS) computer program. The Pearson product moment r was determined to calculate correlations among the variables. A stepwise multiple regression analysis further was employed as a means of choosing independent variables which would provide the optimum predictive formula for predicting success on the algebra Regents examination. There were seven independent variables: X_1 = Students' awareness of the nature and purpose of the Regents; X_2 = Teachers' recommendations; X_3 = Reading grade equivalent average scores; X_4 = Mathematics computation scores; X_5 = Mathematics application scores; X_6 = Mathematics grade equivalent average scores; X_7 = Eighth grade math marks. The dependent or criterion variable, X_0, was Regents grades. A multiple regression equation was determined from the interrelationships of coefficients among the variables. Because of the correlations among the independent variables, partial r's were conducted. In addition F tests and t tests were conducted when needed and to answer questions raised in the hypotheses. All of the p's for the t tests and correlation coefficients are for 2-tailed tests of significance. Table 1 shows the Pearson correlations among all of the variables. Eighth grade marks have the highest correlation ($r = .42$, $p < .01$) with Regents grades. As can be seen almost all the variables correlate among themselves. As expected, there is a high correlation between mathematics grade equivalent average scores and mathematics application scores ($r = .77$, $p < .001$). Mathematics computation scores and mathematics grade equivalent scores correlate high ($r = .65$, $p < .01$). However, a low correlation is revealed between mathematics application scores and mathematics computation skills ($r = -.06$). Teachers' recommendations scores correlate significantly with Regents grades ($r = .38$, $p < .05$) and also correlate significantly with mathematics grade equivalent scores ($r = .44$, $p < .01$). However teachers' recomendations correlate extremely low with math application scores ($r = .04$). The high correlation ($r = .74$, $p < .001$) between teachers' recommendations and eighth grade math marks was expected since students who received high math marks were expected to be recommended by their teachers to take algebra.

Students awareness of the nature and purpose of the Regents correlate ($r = .54$, $p < .01$) with eighth grade math marks and ($r = .41$, $p < .01$) with Regents grades. Students' reading and math grade equivalent scores show a negative correlation ($r = -.08$) suggesting that as students' reading scores increase, their math scores decrease and vice versa. However, this is a weak correlation and is not significant at the .05 level of confidence. The other low correlations

TABLE 1

[a, b]PEARSON CORRELATIONS OF NINTH GRADE REGENTS VARIABLES

X_0	1.00							
X_1	.41**	1.00						
X_2	.38*	.45*	1.00					
X_3	.21	.32	.01	1.00				
X_4	.32*	.35	.62***	-.19	1.00			
X_5	.16	.12	.04	.04	-.06	1.00		
X_6	.32*	.36*	.44**	-.08	.65***	.77***	1.00	
X_7	.42**	.54***	.74***	.11	.54***	.00	.35	1.00
	X_0	X_1	X_2	X_3	X_4	X_5	X_6	X_7

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[a] X_0 = Regents grades, X_1 = Students' awareness of the nature and purpose of the Regents, X_2 = Teachers' recommendations, X_3 = Reading grade equivalent average scores, X_4 = Mathematics computation scores, X_5 = Mathematics application scores, X_6 = Mathematics grade equivalent scores, X_7 = Eighth grade math marks.

[b] N = 29.

*$p < .05$.
**$p \leq .01$.
***$p \leq .001$.

with reading scores are math computation scores, math application scores and math eighth grade marks. None of these correlations reached significance at the .05 level of confidence.

SELECTION OF VARIABLES

The results of the stepwise multiple regression analysis are listed in Table 2. The multiple regression analysis yields a fairly large amount of information including multiple R, R^2, beta weights, F tests and simple r. Multiple R measures the association between the dependent variable and a combination of two or more independent variables. In reporting the data R^2 is preferable to the multiple R, since it lends itself to a more straight forward interpretation. It represents the percent of variation in the dependent variable which is explained by the independent variables working in concert. The F tests on R^2 changes determine whether the addition of an dependent variable contributes significantly to the regression equation. Eighth grade math marks ($r = .42$, $p < .01$), students' awareness ($r = .41$, $p < .01$), math grade equivalent ($r = .32$, $p < .05$), mathematics computation scores ($r = .32$, $p < .05$), and teachers' recommendations ($r = .38$, $p < .05$) correlated significantly with Regents grades. However, when working in concert, not all of these variables contributed significantly to the regression equation.

The use of stepwise multiple regression allowed for the selection of variables for the multiple regression based on the significant contribution made by each independent variable

TABLE 2

SUMMARY OF MULTIPLE REGRESSION OF INDEPENDENT VARIABLES ON REGENTS GRADES FOR TOTAL SAMPLE N = 29

Multiple R	0.52557	Analysis of Variance	DF	Sum of Squares	Mean Square	F-Value
R Square	0.27622	Regression	7.	2749.12450	392.73201	
Adjusted R Square	0.03496	Residual	21.	7203.56560	343.02693	1.14
Standard Error	18.52099					

in conjunction with the other variables. The results of the multiple regression which was computed on the total sample of 29 students appear in Tables 2 and 3. Since $F = 1.14$ (Table 2), the regression is not statistically significant.

The R^2 in Table 3 shows that eighth grade math marks, students' awareness of the nature and purpose of the Regents, mathematics grade equivalent average scores, reading scores, and teachers' recommendations account for 26.5 percent of the variance of Regents grades. With the addition of math computation scores and math applications scores, the variance explained by the variables increased to 27.6 percent.

It is necessary to go further into the results to examine the contributions of the respective independent variables. Beginning with the zero order correlations (simple r's), significant results are demonstrated for eighth grade math marks ($r = .42$, $p < .01$), students' awareness of the nature and purpose of the Regents ($r = .41$, $p < .01$), mathematics grade equivalent average scores ($r = .32$, $p < .05$), mathematics computation scores ($r = .32$, $p < .05$), and teachers' recommendations ($r = .38$, $p < .05$). Reading grade equivalent average scores and math application scores are not significantly related to Regents grades at the .05 level of confidence.

The F tests were computed on R^2 changes to determine whether the addition of a particular independent variable contributed significantly to the regression equation. Eighth grade math grades were the most significant contributors to

TABLE 3

STEPWISE MULTIPLE REGRESSION OF REGENTS GRADES AND PREDICTOR VARIABLES FOR NINTH GRADERS

Variable	Multiple R	R^2	F-Value	Simple r
Eighth Grade Math Marks	.42	.174	5.69*	.42**
Students' Awareness of the Nature and Purpose of Regents	.46	.207	3.39*	.41**
Mathematics Grade Equivalent Average Scores	.48	.228	2.47*	.32*
Reading Grade Equialent Average Scores	.50	.250	2.01	.21
Teachers' Recommendations	.52	.265	1.65	.38*
Mathematics Computation Scores	.52	.266	1.31	.32*
Mathematics Application Scores	.53	.276	1.14	.16

*$p < .05$.
**$p < .01$.

the regression equation ($\underline{F} = 5.69$, $\underline{p} < .01$). The addition of each of the remaining variables increased the accuracy of the prediction. However, only students' awareness of the nature and purpose of the Regents ($\underline{F} = 3.39$, $\underline{p} < .05$) and math grade equivalent average scores ($\underline{F} = 2.47$, $\underline{p} < .05$) reached significance at the .05 level of confidence. Reading grade equivalent average scores ($\underline{F} = 2.01$, $\underline{p} < .05$) and teachers' recommendations ($\underline{F} = 1.65$, $\underline{p} < .05$) added slightly to the prediction. However math computation scores ($\underline{F} = 1.31$, $\underline{p} < .05$) and math application ($\underline{F} = 1.14$, $\underline{p} < .05$) add almost nothing at all to the prediction despite the increase in R^2. Since the variables correlated among themselves, partial $\underline{r}$'s were conducted to determine if the relative importance of each independent variable in making a contribution to the variance of Regents grades could be confirmed. The SPSS package partials out variables which precede the variable under study in order of entry into the regression equation. Significant partial correlations appear in Table 4. Significant results were obtained only for those variables whose $\underline{F}$ tests revealed statistical significance. Partial $\underline{r}$'s for students awareness of the nature and purpose of the Regents ($\underline{r} = .20$, $\underline{p} < .05$) and mathematics grade equivalent average scores ($\underline{r} = .20$, $\underline{p} < .05$) reached significance. These findings confirmed that the above variables made significant contributions to the multiple regression equation.

By entering all of the independent variables on the same inclusion level in the stepwise multiple regression

TABLE 4

PARTIAL CORRELATION COEFFICIENTS BETWEEN SIX PREDICTOR VARIABLES AND REGENTS GRADES

Dependent Variable-Regents Grades

Variable	Partial r
Students' Awareness of the Nature and Purpose of Regents	.204*
Mathematics Grade Average Scores	.201*
Reading Grade Equivalent Scores	.173
Teachers' Recommendations	.174
Mathematics Computations Scores	.136
Mathematics Application Scores	.184

Note: Each coefficient reflects the correlation between the indicated independent variable and Regents grades with the variable and Regents grades with the variable(s) immediately preceding the independent variable partialed out.

$^{*}p < .05$

analysis, the SPSS allows for the selection of a variable in order of its importance in making a contribution to the multiple regression equation. The variable selected first was eighth grade marks. This selection supports what was found by the Pearson correlation (Table 1). The coefficient obtained from the correlation of eighth grade math marks and Regents grades ($\underline{r} = .42$, $\underline{p} < .01$) was the highest coefficient obtained among the independent variables with Regents grades, confirming that the best predictors of Regents grades among the variables studied are eighth grade math marks. Table 3 listed the order in which each variable entered the regression equation based on the amount of contribution each variable accounted for in the variance of Regents grades.

Based on the findings, it can be seen that the multiple correlation $\underline{R}$ of the seven variables with Regents grades is .53 compared with the Pearson product correlation ($\underline{r} = .42$) for eighth grade math marks (X_7) as shown in Table 1. The $\underline{R}$ of .53 indicates that the combined predictor battery of these seven variables has about 28% of the common variance ($\underline{R}^2$) with algebra Regents grades. The best single variable predictors, eighth grade math marks ($\underline{r} = .42$, $\underline{p} < .01$) account for 17% of the common variance of Regents grades.

In sum, from the analysis, the variables that made the most significant contributions in conjunction with each other to the variance of Regents grades were eighth grade mathematics marks (X_7), students' awareness of the nature and purpose of the Regents (X_1), and mathematics grade equivalent average scores (X_6). While the other variables do not make significant contributions to the regression equation, they do not detract from the regression but add to the prediction. The following multiple regression equation was determined as the best predictive formula for predicting Regents grade success on the algebra Regents for this inner city school:

$$X_0 = -11.73 - .42X_7 + .21X_1 + .16X_6 + .16X_3 + .15X_2 + .48$$

Although the seven variables when in concert, have a multiple R of .53, when the optimum predictive equation is calculated, the five best predictive variables have a multiple R of .52, and account for about 27% of the variance of Regents grades.

ANALYSES BASED ON HYPOTHESES

The preceding analyses represented the general results of the correlational and multiple regression techniques. In the following section, the specific hypotheses will be tested. In cases where the general results bear directly on the hypotheses, these results will be recalled.

Hypothesis I stated that inner city junior high school students placed in Regents algebra based on their math levels (Group I) will score significantly higher on the Regents examination than students placed in Regents algebra based on their reading levels (Group II). The null hypothesis of no significant difference between the two groups Regents means was formulated. A t test was conducted to compare the difference between the two means. Table 5 lists the significant t test results. As can be seen the mean of Group II is m = 72.3 as compared to the mean of Group I (m = 70.5). At the .05 level of confidence, the difference is significant (t (27) = 2.38). Thus the null hypothesis of no significant difference between the two groups' Regents means was rejected at the 5% level of confidence.

Hypothesis II stated that students' awareness of the nature and purpose of the Regents has a significant positive correlation with predicting Regents grades. More specifically, a significant positive correlation would be one of at least r = .36 with 27 degrees of freedom (Fisher and Yates, 1963). The null hypothesis of zero correlation between Regents grades and students' awareness of the nature and purpose of the Regents was formulated and tested at the .05 level of confidence. Using the Fisher and Yates table of r values, an r value of .36 was needed to reach significance at the .05 level of confidence. Table 1 showed that the actual correlation between Regents grades and students' awareness of the nature and purpose of the Regents (r = .41, $p < .01$) was high enough to reach significance at the .05 level of confidence. Therefore, the null hypothesis of zero correlation between Regents grades and students' awareness of the nature and purpose of the Regents was rejected at the .05 level of confidence.

TABLE 5

MEAN PERFORMANCE SCORES OF READING AND MATH GROUPS OF ALGEBRA REGENTS

	N	M	SD	t
Group I	20	70.6	22.1	2.38*
Group II	9	72.3	9.2	

*$p < .05$

Hypothesis III stated that eighth grade math marks are not reliable predictors of success on the algebra Regents examination. More specifically, no significant correlation was expected between Regents grades and eighth grade math marks. The null hypothesis of zero correlation between Regents grades and eighth grade math marks was formed and tested at the .05 level of confidence. From the Fisher and Yates table, the $r = .36$ was reached by the correlation between Regents grades and eighth grade marks. Table 1 showed that the actual correlation between these two variables was $r = .42$, $p < .01$. This result was significant, so the null hypothesis of zero correlation between Regents grades and eighth grade math marks was rejected at the .05 level of confidence.

Hypothesis IV stated that mathematics grade equivalent average scores will be the most reliable predictors of success on the Regents examination for inner city junior high school students. In other words, it was expected that math grade equivalent average scores would have the highest positive correlation with Regents grades from among the variables studied. The null hypothesis of no significant correlation ($r = .00$) between Regents scores and math grades equivalent average scores was formulated. Tested at the .05 level confidence, the null hypothesis was accepted. The Pearson correlation results (Table 1) showed that mathematics grade equivalent scores correlated ($r = .32$) with Regents grades. This value ($r = .32$, df = 27) failed to reach the required value ($r = .36$, df (27)) needed to be significant at the .05 level of confidence. In addition, Table 1 showed that eighth grade math marks, students' awareness of the nature and purpose of the Regents, and teachers' recommendations correlated higher with Regents grades than did math grade equivalent average scores.

Hypothesis V stated that teachers' recommendations are significant factors in determining success on the Regents. To be significant factors, a correlation of at least ($\underline{r} = .36$, df = 27) was needed when tested at the .05 level of confidence. An $\underline{r} = .36$, would account for an $\underline{R}^2(.36)^2$ or 13% of the variance in Regents grades if used singly in the multiple regression equation. The null hypothesis of zero correlation between teachers' recommendation and Regents grades when tested at the .05 level of confidence was rejected. From the results (Table 1), the correlation between teachers' recommendations and Regents grades was significant ($\underline{r} = .38$, $\underline{p} < .05$).

Hypothesis VI stated that students math grade equivalent average scores on a standardized math test correlate higher with success on the Regents than do math computation scores with Regents success. More specifically, the correlation between Regents grades and mathematics grade equivalent average scores was expected to be significantly higher than the correlation between Regents grades and mathematics computation scores. The null hypothesis of no significant difference between the two $\underline{r}$'s was formulated and tested at the .05 level of confidence. Table 1 showed the $\underline{r}$ values of these correlations ($\underline{r} = .32$, $\underline{p} < .05$) for both mathematics grade equivalent average scores, and mathematics computation scores with Regents grades. However because math computation scores and mathematics grades equivalent scores were correlated ($\underline{r}$ = .65), a $\underline{t}$ test using the following formula was used to test the significant difference between the $\underline{r}$'s.

$$\underline{t} = \frac{(\underline{r}_{12} - \underline{r}_{13})\sqrt{(N - 3)\ (1 + \underline{r}_{23})}}{\sqrt{2(1 - \underline{r}_{12}^{2} - \underline{r}_{13}^{2} - \underline{r}_{23}^{2} + 2\underline{r}_{12}\underline{r}_{13}\underline{r}_{23})}}$$

$\underline{r} = .32 = \underline{r}_{12}$ = the correlation between Regents grades and math grade equivalent.

$\underline{r} = .32 = \underline{r}_{13}$ = the correlation between Regents grades and mathematics computation scores.

$\underline{r} = .65 = \underline{r}_{23}$ = the correlation between mathematics grade equivalent scores and mathematics computation scores.

$$\underline{t} = \frac{(.32 - .32)\sqrt{(26)\ (1 + .65)}}{\sqrt{2\left[1 - (.32)^{2} - (.32)^{2} - (.65)^{2} + 2(.32)(.32)(.65)\right]}}$$

$$\underline{t} = .00.$$

The $\underline{t}$ value of $\underline{t}(26)$ = .00 failed to reach signifigance. So the null hypothesis of no significant difference between the two $\underline{r}$'s was accepted at the .05 level of confidence.

Hypothesis VII stated that the correlation between mathematics grade equivalent average scores and algebra Regents grades are significantly higher than the correlation between

Regents grades and mathematics application scores. The null hypothesis of no significant difference between the two correlations was formulated and the difference between the two r's was compared. Table 1 showed the r of Regents grades and mathematics grade equivalent average scores was $r = .32$ compared to the correlation ($r = .16$) between Regents grades and mathematics application scores. Since mathematics grades equivalent scores and mathematics application scores were correlated ($r = .77$, $p < .001$), the following formula for correlated data was used to test the significance of the difference between the two r's.

$$t = \frac{(r_{12} - r_{13}\sqrt{(N - 3)\ (1 + r_{24})}}{\sqrt{2\left[1 - r_{12}^2 - r_{14}^2 - r_{24}^2 + 2r_{12}r_{14}r_{24}\right]}}$$

$r_{12} = .32$ = the correlation between Regents grades and mathematics grade equivalent average scores.

$r_{14} = .16$ = the correlation between Regents grades and mathematics application scores.

$r_{24} = .77$ = the correlation between mathematics grade equivalent average scores and mathematics application scores.

$$t = \frac{(.32 - .16)\sqrt{(26)\ (1 + .77)}}{2\left[1 - (.32)^2 - (.16)^2 - (.77)^2 + 2(.32)\ (.16)\ (.77)\right]}$$

$$= \frac{1.08}{1.26}$$

t = .8571

The value $t(26) = .86$ failed to reach significance at the .05 level of confidence. Therefore the null hypothesis of no significant difference between the r's of Regents grades with mathematics grade equivalent scores and Regents grades with mathematics application scores was accepted.

In summary, based on the results, the major findings of this study related to the hypotheses are the following:

1. Inner city high school students assigned to Regents algebra based on math grade equivalent scores do not score significantly higher than students assigned to algebra by reading scores, actually students assigned by reading scored significantly higher than students assigned by math test scores.

2. Students' awareness of the nature and purpose of the Regents is a valid predictor of students' success on the algebra Regents.

3. The single best predictors of success on the algebra Regents for inner city junior high school students are eighth grade math marks.

4. Teachers' recommendations are significant factors in determining success on the Regents.

5. Students' overall mathematics grade equivalent average scores are not better predictors of success on the Regents than math computation or application scores.

CHAPTER V

SUMMARY

The present study focused on the relationship between algebra Regents performance and assigning inner city junior high school students to algebra based on standardized math test scores rather than reading scores. The specific areas of concern were the role of reading and math in assigning students to algebra, identification of predictor variables of algebra Regents success, and determination of the usefulness of these predictors in explaining success on the algebra Regents for inner city junior high school students. The predictor variables under consideration were eighth grade math marks, standardized math and reading test scores, teachers' recommendations, and students' awareness of the nature and purpose of the Regents.

Specifically, an algebra class of 36 ninth grade students were selected and assigned in two groups. One group was based on math achievement test scores and the other was based on reading achievement test scores obtained from a standardized achievement test. The subjects after receiving instruction in Algebra I for a regular school year took the New York State algebra Regents examination.

A prediction equation for algebra Regents success was developed from the multiple correlations among five of seven independent variables with Regents test grades. The five independent variables were eighth grade math marks, students' awareness of the nature and purpose of the Regents, math grade equivalent average scores, reading grade equivalent average scores, and teachers' recommendations. Three of the variables when in concert were found to contribute significantly in predicting algebra Regents success for inner city junior high school students. Seven hypotheses were tested and based on the findings inner city students assigned to algebra based on reading scores actually performed significantly better on the Regents than did students assigned to algebra by math scores. In this chapter, the results are reviewed and discussed. In addition, suggestions for further research are presented.

CONCLUSIONS

The major findings of this investigation showed that within limits inner city junior high school students assigned to algebra based on math test scores did not perform significantly better than students assigned to algebra based on reading test scores. According to Hypothesis I, it was expected that students assigned to algebra based on math scores would do significantly better than students assigned to algebra based on reading; however, this hypothesis was not supported. In fact, the group assigned to algebra based on reading scores did significantly better. In addition to this finding, the single best variable for predicting Regents success in this school was eighth grade math marks. Students' awareness of the nature and purpose of the Regents and teachers' recommendations were also found to be reliable factors in predicting Regents success. The findings related to teachers' recommendations were consistent with those of researchers such as Messler (1961), Erwin (1978), and Lovett (1961) who also concluded that teachers' recommendations were good predictors of algebra success. Further findings reveal that students' overall math achievement tests grade equivalent averages are not better predictors of Regents success than math subtest scores such as computation or application scores.

Students' Awareness of the Nature and Purpose of the Regents

A major reason for conducting this study was to determine if students' awareness of the nature and purpose of the Regents is a significant factor in predicting success on the Regents. Hypothesis II stated that students' awareness of the nature and purpose has a significant positive correlation with success on the Regents. This hypothesis was supported from the evidence. The data showed that students' awareness of the Regents correlated significantly with Regents grades and contributed significantly to the variance of Regents grades in the regression analysis. Students' awareness of the Regents also correlated significantly with all of the other variables except math application scores.

A possible explanation for the correlation of Regents grades and students' awareness of the Regents is that as students' knowledge of a test increase, they are more likely to apply themselves and prepare themselves in taking the test. In addition, with an awareness of the nature and purpose of an exam, some of the students' anxiety (Alpert and Haber, 1969 and Chansky, 1966) may be relieved. Thus they are more likely to perform better on tests. Failure of students' awareness to correlate significantly with math application scores is possibly due to the limited role of math application scores in accounting for students' math grade level. When the data is examined to arrive at a grade equivalent average, most of the students show higher math computation scores than math application scores.

Further assessment of the data on students' awareness of the nature and purpose revealed in the multiple regression analysis indicated that students' awareness of the Regents accounted for 3% of the variance of Regents grades. Although, this was a relative small amount of contribution to the regression equation, the contribution was significant. In fact, students' awareness was the second most significant contributor to the variance of Regents grades from among the variables reported. What is important here is that in selecting variables to predict Regents success in this school students' awareness of the nature and purpose of the Regents should be a key factor for consideration.

In sum, no previous study has been made using inner city students' awareness of the Regents as a predictor of algebra Regents grades. Therefore the findings as related to students' awareness of the Regents are unique. However, the writer expects similar results would be obtained in other schools whether in urban or suburban areas. The accuracy of this writer's expectancy concerning students' awareness of the nature and purpose of the Regents should be tested in future research by drawing samples from a number of other inner city as well as suburban schools.

Teacher Recommendations

Turning to the role of teachers' recommendations, Hypothesis V stated that teachers' recommendations are significant predictors of algebra Regents success. From the evidence of the data, this hypothesis is supported. This finding is consistent with those of Messler (1961), Erwin (1978), Lovett (1961) and others who concluded that teachers' recommendations were good predictors of algebra success. Teachers' recommendations correlated significantly with Regents grades and made a small contribution to the variance of Regents grades. Teachers' recommendations also correlated highly with eighth grade math marks ($\underline{r} = .74$, $\underline{p} < .001$), math computation ($\underline{r} = .62$, $\underline{p} < .01$), and students awareness of the Reents ($\underline{r} = .45$, $\underline{p} < .05$). A possible explanation for these correlations is that students who were recommended for algebra by their teachers had high eighth grade math grades, scored high on the computation part of the math tests, and were also thos students who were mostly aware of the nature and purpose of the Regents. In addition, one of the reasons teachers used in recommending students for algebra was whether or not they felt that the particular students would succeed in algebra. It can be inferred from the results that teachers probably recommended those students who had the highest math grades in their classes. Teachers also probably used math computation scores rather than math application scores as a basis for making their recommendations. From the findings, eighth grade math teachers of inner city junior high school students possibly place more emphasis on math computation skills in their instruction than they do on math application skills. Application skills generally involve problem-solving and reading ability. However, when application scores were examined, they failed to correlate significantly with Regents scores ($\underline{r}$ = .16) or with reading scores ($\underline{r}$ = .04). This further confirms that eighth grade teachers probably place more emphasis on computation scores rather than application scores in recommending students to take algebra. Teachers' recommendations further have a bearing on students' performance because how teachers feel about students' performance is related to attitudes and expectancy (Rothbarth, et al., 1971). Those students whose teachers have high expectations are the students recommended to take algebra.

Eighth Grade Math Marks

The role of eighth grade math marks was explored by correlating eighth grade math marks with Regents grades and six other variables. Hypothesis III stated that eighth grade math marks are not reliable predictors of success on the Regents for inner city junior high school students. Based on the findings, this hypothesis was not supported. Eighth grade math marks correlated significantly with algebra Regents grades.

In fact, eighth grade math marks were found to be the best single predictors of Regents grades. In the multiple regression equation, also eighth grade math marks accounted for about 17% of the variance of Regents grades. In addition, the percentage of contribution made by eighth grade math marks to the variance of Regents grades was more than half the combined contribution made by all of the other variables. As was pointed out, eighth grade math marks also correlated significantly high with teachers' recommendations and students' awareness of the Regents.

Further analysis of the data reveals that students with high eighth grade math marks were also recommended by teachers to take algebra. This finding confirms that eighth grade math teachers place great emphasis on eighth grade math marks in recommending students for algebra (Lovett, 1961). Depite such criteria as test results, classwork behavior, good conduct, attendance, or homework, high eighth grade marks were found to be the most important factor why teachers recommend students for algebra. Contrary to Hypothesis III, eighth grade math marks are reliable predictors of algebra Regents success for inner city junior high school students. In fact, eighth grade math marks appear to be the most important factors in determining algebra Regents success for inner city school junior students.

A possible explanation for this finding is that having high eighth grade math marks reflect a requirement needed by inner city students for success on the algebra Regents. It was expected that inner city teachers' general grading practices of giving eighth grade math marks to inner city students were not consistent with those practices used in other schools. For example, criteria such as having textbooks covered, being prepared with pens and pencils, and other practices which do not reflect a knowledge or proficiency in mathematics are generally used in grading minority students (Williams, 1972). These unusual practices tend to obscure the true mathematical knowledge and ability of students. Therefore, eighth grade math marks were expected not to be a reliable source in forecasting Regents grades.

Mathematics and Reading Standardized Test Scores

Turning to the predictors of mathematics and reading test scores in selecting students for algebra, the findings are mixed. Math and reading test scores were examined as predictors of Regents success. In addition, these scores were examined by comparing the Regents means of the math and reading groups in study. Contrary to what was expected, Hypothesis I was not supported. The findings revealed that students assigned to algebra by reading scores performed better on the Regents examination that those assigned by math scores. One possible explanation for this result may be from the size of the population of the study. Since there were only nine students assigned to the reading group (Group II) who took the Regents, compared to twenty assigned to the math group (Group I), the nine in the reading group possibly had math scores comparable to the math scores of the lower half of the math group. Therefore, those students in the math group whose math scores were high probably did better on the Regents than those students in the reading group who also had high math scores. However, the results are skewed because of the low number of students in Group I. A further assessment of the data reveal that the students assigned by math level who scored lower on the Regents examination had comparable reading scores to those students who passed the test who were assigned by reading scores.

Another possible explanation for the results concerning the performance of students placed in algebra by math and reading scores is that inner city students place greater emphasis on reading than they do on math. Therefore, those students assigned to algebra by reading probably performed better on the reading (problem-solving) component of the Regents examination than did their counterpart among the math level students. Furthermore, since the problem-solving (reading) part of the test account for about 40% of the examination, a larger percentage of students assigned to algebra by reading possibly received more points on this part of the test than did those assigned to algebra by math scores.

This finding shows the importance of reading and inner city students. As Shaw (1956) and Faux (1980) pointed out, since reading is required for much of the work in algebra, reading should be a factor in determining algebra success. Thus in teaching math to inner city junior high school students, reading should play an important role. A third possible explanation for the finding related to Hypothesis I is that factors such as students' motivation, attendance, or class participation may have accounted for the difference between the two groups' performance. The students assigned by reading scores may have been more highly motivated than those assigned to the group by math scores, or simply may have had greater expectation as well as preparation.

In addition to the above findings, reading and mathematics test scores were investigated as predictors of Regents grades through the use of multiple correlation techniques. From what was found regarding the performance of students assigned to algebra by reading as opposed to math, one would think that reading would play a significantly greater role in predicting algebra success than math test scores. In examining the data, both reading and math scores correlated with Regents grades. However, the correlation between Regents grades and reading grades failed to reach significance at the .05 level of confidence. Each of these predictors also contributed about the same amount to the variance of Regents grades. Although neither of these variables made significant contributions to the multiple regression equation, they did add to the regression when entered in to the regression and equation on their respective steps.

Based on the findings, both math grade equivalent levels and reading grade levels should be considered in selecting students for algebra. Other researchers such as Byrd (1980), Erwin (1978), Faux (1980), Lovett (1969), Shaw (1956), Sommerfield and Tracy (1963), and Sims (1980) concluded that math and reading standardized test scores are good predictors or reliable predictors of algebra success. The findings of this study are consistent with those of the above researchers where success is looked at in terms of the Regents performance for inner city junior high school students.

In summary, while mathematics achievement test scores and reading test scores are good predictors of success for inner city junior high school students, based on the results of this study, students assigned to algebra based on reading scores did significantly better on the Regents than those assigned to algebra by math scores. However, it must be remembered that students' eighth grade math performance (grades) and students' awareness of the nature and purpose of the Regents are more reliable predictors of success for inner city junior high school students than are reading or math test scores. Therefore it appears that junior high school inner city students perform better on Regents when they are knowledgeable as to why they are performing the task of taking the Regents and to what extent the task will benefit them. Furthermore, students' eighth grade math performances (grades) are the most important criteria for Regents success for inner city junior high school students.

EDUCATIONAL IMPLICATIONS AND RECOMMENDATIONS

The findings of this study have several important implications for education. This study also showed that inner city junior high school students' success or performance on the alegebra Regents examination are related to the same academic factors which ensure success or failure by students of suburban areas.

When assessing the total predictive validity of the variables in this study, the question may be asked are there other factors or variables which may account for greater predictive validity of Regents grades? Moreover, how may inner city junior high school students benefit from these predictive factors? For example, forecasting success on the Regents may have been expressed in terms such as study habits, students' motivation, teacher personality, teaching skills, home and school relationships or a list of other predictive criteria. Therefore, in selecting predictive variables for algebra Regents success, reliance should not be placed on any one set of criteria but a careful study should be made by the individual school's situation and the results used to show the highest predictive value determined by various combinations of variables.

This study further offers evidence that shows that students assigned to algebra by reading grade levels perform better on the Regents than students assigned to algebra by math test grade level. This finding has definite implications for pedagogy. Obviously, in preparing students for algebra, the role of reading as it relates to solving algebraic operations should be emphasized. Perhaps students should receive reading instructions in the eighth grade as preparation for the study of algebra. Students who receive no reading instruction as a preparation for the algebra Regents are not likely to perform on the Regents as well as those who receive some reading instruction along with math instruction. While the findings of the study are not conclusive, they do lend to the need of teachers and administrators to seriously evaluate the role of reading as a factor in helping inner city junior high school students perform better on the algebra Regents.

When evaluating the variables used in this study, there is no evidence that indicate that standard variables such as reading scores, eighth grade performance, and teachers' recommendations are not reliable predictors of success on the algebra Regents for inner city junior high school students. Any of these variables or a combination of them may be used to predict Regents success. The most important point to consider in selecting these variables is to determine to what extent the individual school should place emphasis of these standard variables.

One additional note should be made about the present investigation's precedures. Although no specific hypothesis was made about the time of day students took algebra, students were programmed for algebra during the first period of the day. This study did not investigate this effect or factor as it relates to students' success on the Regents. Rodrique (1979) had concluded that the time of day students took algebra was important in predicting students' success in algebra. From her study, she showed that the first and fifth periods were the best periods to take algebra, while the fourth and sixth periods were the least advantageous times to take algebra. The factor is important and should be addressed in future research.

The present data indicated that there were definitely other factors contributing to students' algebra Regents success which were not addressed in this study. For instance, since about 80% of the students in this school taking the Regents passed compared to the previous year of 31%, the concern for these other factors that help account for Regents success should be addressed. Factors such as time of day, attendance, parental concern, or administrative attitudes toward the Regents or testing in general should be addressed.

Moreover, since the students who were grouped by reading scores did significantly better on the Regents than those grouped by math,and the past procedures in this school has been to group students by reading score, then the issue is further raised, why has the percentage of students passing the Regents been so low? Could the causes be related to classroom behavior such as student-teacher interaction, teachers' expectations, students' self-image, poor guidance, or some other pedagogical ideology? It may be true that many students simply did not have the ability or lacked the necessary preparation for achieving success on the Regents, therefore, they should have been guided in another direction. On the other hand, many students who failed the Regents may have been able to make satisfactory progress in general math.

Therefore, of major importance, this study has indicated the need for students' future plans and aspirations to be taken into consideration before they are enrolled in algebra or Regents algebra. Many students may not need to take algebra or the Regents, simply because they do not need the skills of algebra. On the other hand, for those students who do need to demonstrate success on the Regents, this study reinforces the point that success on the Regents is related to the need for proper guidance for inner city junior high school students.

In summary, because of the limited size of this study, further in depth study is needed on inner city students' success on the algebra Regents. The present study's results suggest an immediate need to begin research on the relationships among factors such as attitudes, teachers' expectations, students' self-image, students' future aspirations and plans, and guidance of inner city students as criteria in selecting students for Regents Algebra.

APPENDIX A

STUDENT MATH SURVEY QUESTIONNAIRE

TO STUDENTS:

This is a questionnaire to help us know how students feel about their school, their subjects and their desire to learn. The information you supply will also help us plan and schedule classes more effectively.

Some of the questions ask that you circle one of the answers; however, some questions ask you to write your answer in the space given. There are no right or wrong answers. THIS IS NOT A TEST. Please be sure to answer all the questions. Thank you for your cooperation.

1. What grade are you in? ______________
2. How long have you been in this school? ____________
3. What is the name of your school? ____________
4. What other school(s) have you attended? ______________
5. Have you ever been retained (held over) in a grade? ___
6. How old are you? ___________
7. What is your background?
   a. Black b. Hispanic - P.R.
   c. Other d. White
8. Where do(es) your parent(s) work? _______________
9. Are your parent(s) a member of the PTA? ___________
10. Are your parent(s) a member of the Local School Board? _________
11. Are your parent(s) a member of the Advisory Board? _________
12. Are your parent(s) a member of other community organizations?
13. How is your school different from the way it was last year?
    ____
    ____
14. Is it a. better b. worse c. the same
15. The teachers are
    a. stricker b. meaner c. more demanding
    d. less demanding e. none of these
16. In class the students are
    a. quieter b. noisier
    c. friendlier d. badder
17. Should students be suspended for fighting? a. Yes b. No
18. Should students be suspended for cheating on a test?
    a. yes b. no
19. How do you spend most of your time away from school?
    a. playing b. in the library
    c. reading d. doing homework
    e. working f. other______________________
20. How many hours a day do you spend doing homework? _____________
21. How many hours a day do you spend studying?_____________________
22. How many hours a day do you spend watching TV?_________________
23. How many hours a day do you spend on Math homework?___________
24. What do you like best about your school?___________________
    ____
25. What do you like least about your school?__________________
    ____
26. What do you like to do most at school?_____________________
    ____
27. What subject gives the easiest test?_______________________
28. What subject gives the hardest test?_______________________
29. The name of my math text book is___________________________
30. The author of my math text book is_________________________
31. Do you like taking tests? ________________
32. Would you like to stay after school each day to study and do additional math work? ______________________
33. What other subject would you like to study after school?__________
34. What subject do you like best?______________________________
35. What subject do you like least?_____________________________
36. What math are you taking?
    a. 8 year b. Pre-Algebra c. Algebra I d. Other_____________

37. Algebra is math that deals with ______________________________
____

38. My math class is too?
a. noisy c. boring e. hard
b. quiet d. easy

39. I like math because ____
____

40. I do not like math because ___________________________________
____

41. The Regents is a ____
____

42. The Regents is given in ______________________________________

43. The purpose of the Regents is to _____________________________
____

44. The passing grade for Math is _________________________________

45. In order to take algebra a student should have
a. a higher reading level than math
b. a reading and math level that are the same
c. a higher math level than reading
d. it does not matter which level is higher

46. The hardest thing about learning math is _____________________
____

47. Math is important because ____________________________________
____

48. Algebra is useful in ____
____

49. I am taking/not taking algebra because ________________________
____

50. My algebra class could do better if there were
a. less noise
b. more discussion
c. more homework
d. more reading in class
e. other ____

51. I like to study
a. alone
b. with one or two others
c. not at all

APPENDIX B

TEACHERS RECOMMENDATION FORM

Teachers Name

Please indicate which students from your 8th grade math classes you would recommend to take algebra next year.

Student's Name	Official Class	Expected Grade	Math Level (G.E.)
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Please leave completed form in mailbox of Grade A.P., Guidance Office for Mr./Mrs.____________________________.

Thank you for your consideration.

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